

**What is claimed is:**

1           1.       A pulse-type gas concentration measurement  
2 system, comprising:

3           a sensor disposed in a specific environment, the  
4           sensor having a voltage input element, an  
5           output element and a sensing element;

6           a pulse power supply module connected to the voltage  
7           input element; and

8           a processing device storing a plurality of chemical  
9           matter characteristics signals connected to the  
10          output element of the sensor;

11          when the pulse power supply module sends a variable  
12          pulse-modulated voltage to the sensor through  
13          the voltage input element, the sensor outputs a  
14          first signal to the processing device through  
15          the output element, and the processing device  
16          determines a detection voltage according to the  
17          first signal and compares the first signal with  
18          the chemical matter characteristics signals to  
19          determine composition of the gas and  
20          concentration of respective constituents of the  
21          gas;

22          when the pulse power supply module sends a square-  
23          wave pulse with the detection voltage to the  
24          sensor through the voltage input element, the  
25          sensor outputs a second signal to the  
26          processing device through the output element,  
27          and the processing device compares the second  
28          signal to the chemical matter characteristics

29                   signal to determine the concentration of  
30                   respective constituents of the gas.

1           2.       The pulse-type gas concentration measurement  
2           system according to claim 1, wherein the processing  
3           device determines an ideal voltage related to a maximum  
4           voltage of the first signal from the variable pulse-  
5           modulated voltage, and determines the detection voltage  
6           as a voltage larger than the ideal voltage.

1           3.       The pulse-type gas concentration measurement  
2           system according to claim 1, wherein the sensing element  
3           comprises a membrane of a metallic oxide.

1           4.       The pulse-type gas concentration measurement  
2           system according to claim 3, wherein the metallic oxide  
3           comprises tin oxide ( $\text{SnO}_2$ ).

1           5.       A method of pulse-type gas concentration  
2           measurement, comprising the steps of:  
3           providing a sensor in a specific environment;  
4           sending a variable pulse to the sensor, so that the  
5           sensor outputs a first signal corresponding to  
6           gas in the specific environment;  
7           comparing the first signal with a plurality of  
8           chemical matter characteristics signals to  
9           determine a first identification result for the  
10          gas;  
11          determining a detection voltage according to the  
12          first signal;  
13          sending a square-wave pulse with the detection  
14          voltage to the sensor, so that the sensor

15                    outputs a second signal corresponding to the  
16                    gas; and  
17                    comparing the second signal with a plurality of  
18                    chemical matter characteristics signals to  
19                    determine a second identification result for  
20                    the gas.

1            6.        The method of pulse-type gas concentration  
2            measurement according to claim 5, wherein the first  
3            identification result and the second identification  
4            result for the gas respectively comprise the  
5            concentration of respective constituents of the gas.

1            7.        The method of pulse-type gas concentration  
2            measurement according to claim 5, wherein the chemical  
3            matter characteristics signals are obtained by:  
4                    disposing the sensor in a plurality of predetermined  
5                    chemical matters and sending a variable pulse-  
6                    modulated voltage to the sensor respectively,  
7                    so that the sensor outputs each of the chemical  
8                    matter characteristics signals corresponding to  
9                    each of the predetermined chemicals; and  
10            storing the chemical matter characteristics signals  
11            in a database.

1            8.        The method of pulse-type gas concentration  
2            measurement according to claim 5, wherein the variable  
3            pulse is a pulse-modulated voltage.

1            9.        The method of pulse-type gas concentration  
2            measurement according to claim 5, wherein the first  
3            signal comprises a pulse voltage signal.

1           10.     The method of pulse-type gas concentration  
2 measurement according to claim 9, wherein the step of  
3 determining the detection voltage according to the first  
4 signal further comprises:

5                 determining an ideal voltage related to a maximum  
6                         voltage of the first signal from the variable  
7                         pulse; and

8                 determining the detection voltage as a voltage  
9                         larger than the ideal voltage.

1           11.     A method of pulse-type gas concentration  
2 measurement, comprising the steps of:

3                 providing a sensor in a specific environment;

4                 sending a variable pulse to the sensor, so that the  
5                         sensor outputs a first signal corresponding to  
6                         a plurality of gases in the specific  
7                         environment;

8                 comparing the first signal with a plurality of  
9                         chemical matter characteristics signals to  
10                         determine a first identification result for the  
11                         gases;

12                 determining at least one detection voltage according  
13                         to the first signal, wherein each detection  
14                         voltage corresponds to one of the gases;

15                 sending at least one square-wave pulse with the  
16                         detection voltage to the sensor, so that the  
17                         sensor outputs at least one second signal  
18                         corresponding to the gases; and

19                 comparing the second signal with a plurality of  
20                         chemical matter characteristics signals to

21                   determine a second identification result for  
22                   the gases.

1           12.       The method of pulse-type gas concentration  
2           measurement according to claim 11, wherein the first  
3           identification result for the gases comprises composition  
4           of the gases.

1           13.       The method of pulse-type gas concentration  
2           measurement according to claim 12, wherein the second  
3           identification result for the gases comprises  
4           concentration of respective constituents of the gases.

1           14.       The method of pulse-type gas concentration  
2           measurement according to claim 11, wherein the chemical  
3           matter characteristics signals are obtained by:

4                   disposing the sensor in a plurality of predetermined  
5                   chemical matter and sending a variable pulse-  
6                   modulated voltage to the sensor respectively,  
7                   so that the sensor outputs each of the chemical  
8                   matter characteristics signals corresponding to  
9                   each of the predetermined chemicals; and  
10           storing the chemical matter characteristics signals  
11           in a database.

1           15.       The method of pulse-type gas concentration  
2           measurement according to claim 11, wherein the variable  
3           pulse is a pulse-modulated voltage.

1           16.       The method of pulse-type gas concentration  
2           measurement according to claim 11, wherein the first  
3           signal comprises a pulse voltage signal.

1        17.        The method of pulse-type gas concentration  
2 measurement according to claim 16, wherein the step of  
3 determining at least one detection voltage according to  
4 the first signal further comprises:

5                determining at least one ideal voltage related to at

6                        least one maximum voltage of the first signal

7                                from the variable pulse; and

8                determining each detection voltage as a voltage

9                        larger than each ideal voltage.

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